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Application of Self-determination theory in the e-health industry:

Promoting sustainable exercise motivation

Introduction

The project is based on an ongoing PhD-project on interactive motivational tools for exercise adherence, but will extend beyond the dissertation as an independent (post doc) project. The project is divided into three phases (see Figure 1), where the first and second phase has received external financial support and an application for the third phase is initiated. This paper concerns the first phase where a digital tool prototype will be developed and tested (Weman-Josefsson et al., 2014). The overall aim is to create a theory based digital intervention for sustainable exercise behaviours using an interdisciplinary approach in designing and implementing a motivational concept developed in the PhD-project. The core process that transforms ideas into innovation is when new ideas, products and services receive wide acceptance and diffusion in the society; therefore another central aspect of this research project is to study business models for e-health products and services.

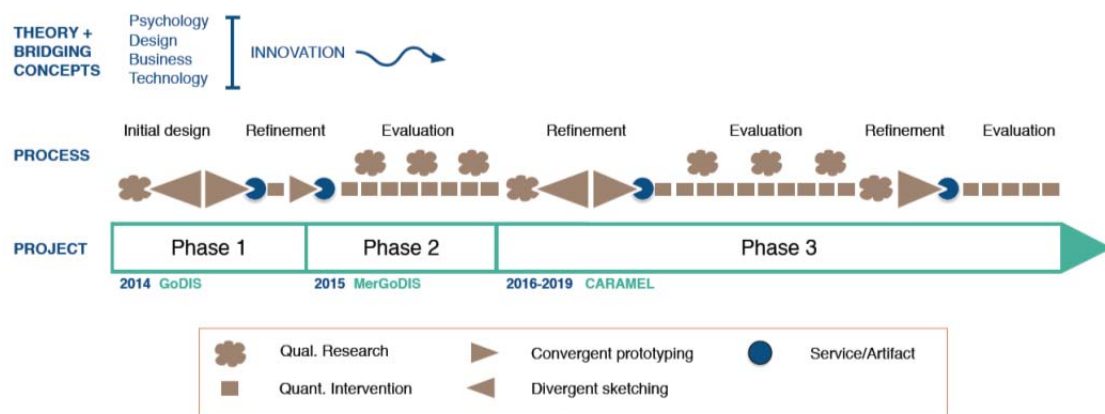


Figure 1. Project overview

Exercise adherence is recognized as a significant challenge (Patrick & Canavello, 2011), emphasizing the need for professional support structures for the promotion of sustainable exercise

behaviours adjusted to involve the right action, for the right person, at the right time. The intervention content is therefore firmly based on Self-Determination Theory (SDT; Deci & Ryan, 1985, 2000; Ryan & Deci, 2002), a renowned theory of motivation in health (Ng et al., 2012) and exercise domains (Teixeira, Carraca, Markland, Silva, & Ryan, 2012). SDT is focused on how the social environment could facilitate or thwart optimal motivation and to the extent behaviours are governed mainly by self-determined or controlling aspects (Deci & Ryan, 2000). It is postulated that the use of so called autonomy support (e.g. encouraging choice) as opposed to using control (e.g. demands or coercion) constitute the optimal social context in order to successfully inspire self-determined motivation. Autonomy supportive environments will promote self-determined motivation and psychological well-being by fulfilling certain basic psychological needs (Ryan & Deci, 2002), why interventions successfully nourishing these needs have the potential to increase self-determined exercise motivation and sustainable exercise behaviours (Edmunds, Ntoumanis, & Duda, 2006).

Objective

The main aim of Phase 1 are to design an interactive tool based on the field of psychology combined with information technology and innovation science, considering e-health industrial requirements and user needs. Related to the overall aim, a critical research question is to identify how such a multifaceted project can be organized and mastered. Other essential research questions relate to:

- What is the efficacy of using Self-Determination Theory (SDT) in designing, constructing and evaluating an exercise intervention?
- How do SDT concepts and proposed psychological mechanisms relate to exercise behaviours?
- How can SDT-related components like autonomy support be implemented in digital artefacts?
- How could this kind of innovation affect development of integrated and interactive business models?

Method

The digital intervention is based on a literature review mapping exercise motivation related to self-determination theory (Weman-Josefsson, 2014), complemented by qualitative interaction design methodologies capturing participant goals, behaviour, preferences, attitudes and frustrations.

Essentially, the intervention content consists of autonomy supportive structures, goal-setting support, relapse prevention and self-regulation structures, health information and web links. The design process to date has reached the prototyping phase (see Figure 2) and the randomized controlled trial (RCT) that will be used to pilot test the intervention prototype is scheduled to start in February 2015.

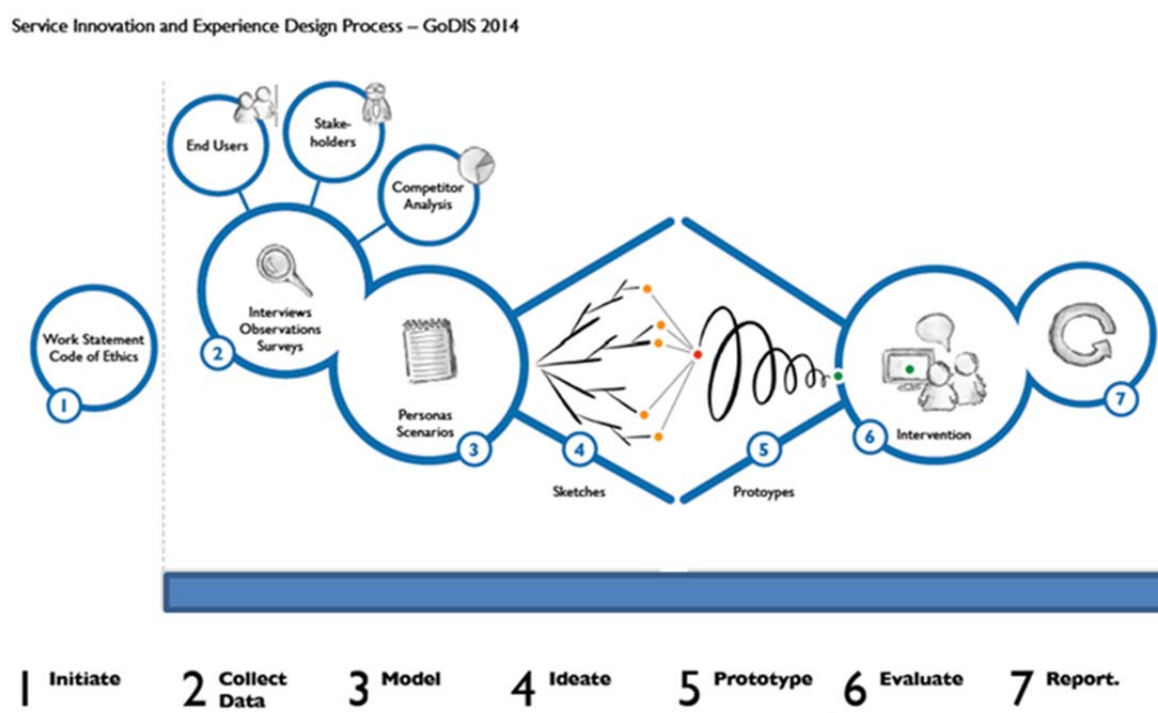


Figure 2. The design process

The population involves existing members and clients ($n > 10\,000$) of two health service companies and outcomes relate to psychological need fulfilment (*The Basic Psychological Needs in Exercise Scale*), self-determined exercise motivation (*The Behavioral Regulation in Exercise*

Questionnaire-2) and exercise behaviour, measured both by self-report measures (*Godin Leisure-Time Exercise Questionnaire*) and pedometers. The pilot RCT contains three measure points over a six weeks period in order to allow advanced analyses of potential mechanisms (i.e. mediating and moderating effects) and profiles (latent growth curve models) of exercise motivation and behaviour. Modern analytical approaches will be used, such as structural equation modelling (SEM) and mediation analyses using bootstrapping resampling approach (Preacher & Hayes, 2008), enabling examination of measurement-free associations between constructs and more robust mediational paths.

Results

Although a short time span, results are expected to align with the theoretical stipulations of the SDT process model, i.e. that the autonomy supportive digital intervention will affect psychological need fulfilment, which in turn will impact exercise behaviour via increased self-determined motivation. The study will also provide possibilities to cross-reference subjective and objective data with each other and with motivational concepts and temporal aspects. This pilot study constitute a baseline for elaboration into the second phase (see Figure 1), where the digital tool will be refined and longitudinally tested and evaluated over a nine months period.

Discussion

This study progress common cross-sectional research into more multifaceted associations of how exercise and motivation changes across time. Instead of trying to change behaviours per se, we aim to impact the mediators (e.g. self-determined motivation) which could yield valuable guidelines for cost-effective and successful exercise intervention design (Cerin & Mackinnon, 2009). Application of behavioural theory in e-health industry through interdisciplinary research and practice will operationally support relevant public health needs in exercise promotion and have the potential to produce new ideas and products, utilization values and knowledge distribution.

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